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EXAMINER	
RAIZEN, DEBORAH A	

ART UNIT	PAPER NUMBER
2873	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/826,587	TADIC-GALEB ET AL.
	Examiner	Art Unit
	Deborah A. Raizen	2873

AL

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 3, 4, and 9 are objected to because of the following informalities: In claim 3, line 2, claim 4, line 1, and claim 9, line 9, the limitation "to locate the image" is confusing because "the image" means something else elsewhere in the claims. It would better if it were changed to "the final image", "the final screen image", "the target image", or "the image on the screen". Antecedent basis should also be provided in claims 1 and 9, at least for "the screen", if the term is used. Reciting the limitation in terms of "throw distance" would be an acceptable alternative.

2. Claim 10 is objected to because of the following informalities: in line 3, "tube" is spelled "rube". Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4 and 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 4 recites the limitation "the lens element adapted to locate the image" in line 1. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 5 recites the limitation "said image source" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claim 15 is rejected under 35 U.S.C. 102(b) as being anticipated by Moskovich (5,200,861). Moskovich discloses a lens assembly (Fig. 7 and Table 7) for use in projecting a telecentric image (col. 5, lines 38-45; col. 2, lines 5-50), comprising: a telecentric lens assembly adapted to receive an image from an image source (Fig. 7 shows that the principal rays are parallel to the optical axis between IS and L6), and that allows an image of said image source to be projected onto a projection surface (col. 5, lines 38-45), wherein said telecentric lens assembly comprises a spherical lens element (L4), an aspheric lens element (L1), and a set of positively powered lens elements (L3, L5, and L6).

9. Claim 15 is rejected under 35 U.S.C. 102(a) as being anticipated by international publication WO 02/080577 A1 (application number PCT/EP02/03385; the publication US 2004/0090600 A1 by Blei et al. is used as a translation of the international publication; although the discussion below refers to the reference as "Blei' and cites text and figures in the translation, the basis for the rejection is the international publication). Blei discloses a lens assembly (Fig. 2: elements 18 to 41 along optical axis OA) for use in projecting a telecentric image (Fig. 1),

comprising: a telecentric lens assembly (elements 18-41, shown to be telecentric because the principal rays are parallel to the optical axis at the image source) adapted to receive an image from an image source (LCD 5), and that allows an image of said image source to be projected onto a projection surface (10 in Fig. 1), wherein said telecentric lens assembly comprises a spherical lens element (41; paragraph [0031] discloses that only surface 123 is aspheric), an aspheric lens element (40; paragraph [0031]), and a set of positively powered lens elements (38, 36, 34, 32, and 31).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1, 3, 4, 8, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moskovich (5,200,861) in view of Jacobsen (5,804,919).

In regard to claim 1, Moskovich discloses a system for projecting an image (Fig. 14 and Table 14), comprising a liquid crystal display (LCD) image source and a lens assembly, the lens assembly comprising in order: a spherical lens element (L3), an aspheric lens element (L4), and a set of positively powered lens elements (L5, L7, and L8). However, Moskovich does not disclose that the system comprises a cathode ray tube (CRT) that includes a resonant microcavity phosphor and that is capable of producing telecentric light for an image. Jacobsen discloses a system for projecting an image comprising a cathode ray tube including a resonant microcavity

phosphor and capable of producing telecentric light for an image (Fig. 23, col. 13, lines 1-15: the CRT itself is the image source, and col. 20, lines 31-62: the CRT produces telecentric light for an LCD panel). Furthermore, Jacobsen teaches that using a CRT with a resonant microcavity (col. 20, lines 51-52 discloses that the microcavity can be excited by any one of the three excitation means, which include electron beam bombardment of the phosphor, col. 5, lines 62-64, col. 13, lines 1-3) to produce telecentric light for an LCD panel has the advantage of increased light output efficiency (col. 21, lines 6-14). Alternatively, Jacobsen's explanation that the CRT with resonant microcavity is superior to conventional methods for full color projection televisions because it allows highly directional output, controlled chromaticity, and high external efficiency (col. 13, lines 9-15) suggests that the CRT with resonant microcavity as an image source is superior to a liquid crystal display, a method for full color projection television that has been available for over twenty years, for those reasons. Also, the disclosure in Moskovich that the lens assemblies disclosed in Moskovich are designed to gather and transfer light efficiently from an image source that emits light into a small cones of light with centers perpendicular to the image source (col. 2, lines 37-50) suggests that a directional light source such as the CRT with resonant microcavity of Jacobsen could replace the LCD of Moskovich with good performance of the system. Therefore, it would have been obvious to one of ordinary skill in the art to use the Jacobsen cathode ray tube including a resonant microcavity phosphor and capable of producing telecentric light for an image as the light source for the Moskovich system or instead of the liquid crystal display in the Moskovich system because a cathode ray tube including a resonant microcavity phosphor would provide increased light output efficiency, highly directional output, and controlled chromaticity, as taught by Jacobsen.

In regard to claim 3, the Moskovich lens assembly further comprises an additional lens element adapted to locate the image (L1).

In regard to claim 4, in the Moskovich lens assembly, the lens element adapted to locate the image is a negatively-powered meniscus lens element (Fig. 14 and, from Table 14, the focal length of L1 is about −287 mm).

In regard to claim 8, the Moskovich system further comprises multiple LCD panels that project telecentric light for an image (col. 5, lines 46-50: three, one for each primary color); and a separate lens assembly for each of the LCD panels (col. 5, lines 46-50). However, Moskovich does not disclose that the system comprises multiple cathode ray tubes, with a separate lens assembly for each of the multiple cathode ray tubes. Jacobsen discloses a system for projecting an image that has multiple cathode ray tubes (col. 13, lines 9-15 and col. 20, lines 60-61: three, one for each primary color). As explained in the rejection of claim 1 above, Jacobsen teaches that using cathode ray tubes that have resonant microcavities as the light sources for LCD panels has the advantage of increased light output efficiency (col. 21, lines 6-14). Also, Jacobsen suggests that using cathode ray tubes that have resonant microcavities as the image sources in a system for projecting an image instead of LCD panels has the advantages of allowing highly directional output, controlled chromaticity, and high external efficiency. Therefore, it would have been obvious to one of ordinary skill in the art to use multiple cathode ray tubes that have resonant microcavities as the light sources for the three LCD panels in the Moskovich system because such a projection system would have increased light output efficiency, as taught by Jacobsen. It would also have been obvious to one of ordinary skill in the art to use multiple cathode ray tubes that have resonant microcavities as the image sources instead of the multiple

LCD panels in the Moskovich system because such a projection system would have the advantages of allowing highly directional output, controlled chromaticity, and high external efficiency, as suggested in Jacobsen.

In regard to claim 16, Moskovich discloses the lens assembly according to claim 15, as explained above in Claim Rejections – 35 USC § 102. However, Moskovich does not disclose that the lens assembly further comprises a cathode ray tube (CRT) adapted to generate the image to be projected. Jacobsen discloses a projection apparatus that comprises a cathode ray tube adapted to generate the image to be projected (Fig. 23, col. 13, lines 1-15, and col. 20, lines 31-62; the cathode ray tube is disclosed to be the light source for the LCD modulator so that it contributes to generating the image to be projected). Jacobsen teaches that a cathode ray tube with an RMD, a resonant microcavity display, can be substituted for the arc lamp used in projection devices (col. 20, lines 57-62). Furthermore, Jacobsen teaches that such a substitution has advantages such as increased light output efficiency (col. 21, lines 6-14). Also, Moskovich discloses that the telecentric lens assembly is appropriate for a directional light source (col. 2, lines 36-50), as Jacobsen discloses the CRT with RMD to be. Therefore, it would have been obvious to one of ordinary skill in the art to include a cathode ray tube, with a resonant microcavity display, adapted to generate the image to be projected, in the lens assembly disclosed in Moskovich because it would provide increase light output efficiency, as taught by Jacobsen.

12. Claims 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobsen (5,804,919) in view of Moskovich (5,200,861).

In regard to claim 14, Jacobsen discloses a system for projecting an image (col. 13, lines 1-15), comprising: a plurality of cathode ray tubes (col. 13, lines 9, 10), wherein each of said plurality of cathode ray tubes includes a resonant microcavity phosphor (col. 13, lines 16, 17) and a faceplate (the CRT inherently has faceplate because either the microcavity itself, disclosed to be coplanar in col. 13, line 24, is the faceplate, or it has other covering layers, one of which will have the surface from which light exits the CRT), and wherein each of said cathode ray tubes is capable of projecting telecentric light (col. 13, lines 25-27: light that exits perpendicular to the plane of the thin film device would have principal rays that are parallel to the optical axis) for an image (col. 2, lines 45, 46); a plurality of lens assemblies optically coupled respectively to each of said plurality of cathode ray tubes (col. 1, lines 26-29), wherein each lens assembly is adapted to receive an image from its respective cathode ray tube (the term "coupled" in col. 1, line 28, inherently means that the light from the cathode ray tube, which carries the image, is received by the lens). However, Jacobsen does not disclose that the lens assembly is telecentric. Moskovich discloses that a telecentric lens assembly is appropriate for a directional light source (col. 2, lines 36-50), as Jacobsen discloses the CRT with RMD to be (col. 4, lines 45-49), because a telecentric lens assembly efficiently gathers and transfers the light to the image screen (col. 2, lines 45-50). Therefore, it would have been obvious to one of ordinary skill in the art to use telecentric lens assemblies, as disclosed in Moskovich, in the Jacobsen system for projecting an image because such lens assemblies are appropriate for a directional light source, as taught in Moskovich.

In regard to claim 15, Jacobsen discloses a lens assembly for use in projecting a telecentric image (col. 1, lines 26-29, col. 13, lines 9-28, and col. 15, lines 43-46 and 66),

comprising: a lens assembly adapted to receive an image from an image source (col. 1, lines 26-29; the term "coupled" in col. 1, line 28, inherently means that the light from the cathode ray tube, which carries the image, is received by the lens), and that allows an image of said image source to be projected onto a projection surface (inherent in the term "projection", col. 1, line 29 and col. 13, line 9). However, Jacobsen does not disclose that the lens assembly is telecentric and that it comprises a spherical lens element, an aspheric lens element, and a set of positively powered lens elements. Moskovich discloses a lens assembly for use in projecting a telecentric image, comprising the recited telecentric lens assembly (as detailed in the rejection of claim 15 under 35 USC §102 above). Furthermore, Moskovich teaches that it is necessary to use a telecentric lens assembly when the light is quasi-parallel to the optical axis because such a lens assembly can efficiently gather and transfer the light from the image source to the image screen (col. 2, lines 37-50). Moskovich further teaches that the spherical lens element L4 is necessary for correcting chromatic aberrations (color correcting, col. 8, lines 4-5), that the aspheric lens element L1 is necessary for correction of other aberrations (col. 3, lines 67-68 and col. 4, lines 14-18), and a set of positively powered lens elements (L3, L5, and L6) are necessary for color correction (L5, col. 8, lines 4-5), for correction of overall aberrations in the system (L6, col. 4, lines 60-64), and for correcting axial color and spherical aberrations for lenses having higher speeds (L3, col. 4, lines 54-59; and in Table 16, embodiment 7 is disclosed to have an f/No. of 2.00, which is the lowest value disclosed). Therefore, it would have been obvious to one of ordinary skill in the art to use the telecentric lens assembly disclosed in Moskovich as the Jacobsen lens assembly because a telecentric lens assembly is necessary to efficiently gather and transfer the quasi-parallel light from the image source to the image screen, as taught by

Moskovich, and because the each of the recited elements has a role in the lens design, in particular for correcting aberrations, as taught by Moskovich.

In regard to claim 16, the Jacobsen lens assembly further comprises a cathode ray tube adapted to generate the image to be projected (col. 1, line 29, col. 13, lines 1-15, and col. 15, lines 43-46 and 66).

In regard to claim 17, in the Jacobsen lens assembly, the image source is a cathode ray tube faceplate (col. 13, line 1-25; the CRT inherently has faceplate because either the microcavity itself, disclosed to be coplanar in col. 13, line 24, is the faceplate, or it has other covering layers, one of which will have the surface from which light exits the CRT).

In regard to claim 18, in the Jacobsen lens assembly, the cathode ray tube is a resonant microcavity phosphor device (col. 13, lines 1-17).

13. Claims 1, 2, 5-7, 9-12, and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over international publication WO 02/080577 A1 (application number PCT/EP02/03385; the publication US 2004/0090600 A1 by Blei et al. is used as a translation of the international publication; although the discussion below refers to the reference as "Blei' and cites text and figures in the translation, the basis for the rejection is the international publication) in view of Jacobsen (5,804,919) and further in view of Moskovich (5,200,861).

In regard to claim 1, Blei discloses a system for projecting an image (Fig. 2), comprising an LCD that produces telecentric light for an image (5); and a lens assembly (the optical elements from field lens 18 to negative meniscus lens 41 along optical axis OA), the lens assembly comprising in order: a spherical lens element (41; paragraph [0031] discloses that only

surface 123 is aspheric), and aspheric lens element (40; paragraph [0031]), and a set of positively powered lens elements (38, 36, 34, 32, and 31). However, Blei does not disclose that the system comprises a cathode ray tube (CRT) that includes a resonant microcavity phosphor and that is capable of producing telecentric light for an image. Jacobsen discloses a system for projecting an image comprising a cathode ray tube including a resonant microcavity phosphor and capable of producing telecentric light for an image (Fig. 23, col. 13, lines 1-15: the CRT itself is the image source, and col. 20, lines 31-62: the CRT produces telecentric light for an LCD panel). Furthermore, Jacobsen teaches that using a CRT with a resonant microcavity (col. 20, lines 51-52 discloses that the microcavity can be excited by any one of the three excitation means, which include electron beam bombardment of the phosphor, col. 5, lines 62-64, col. 13, lines 1-3) to produce telecentric light for an LCD panel has the advantage of increased light output efficiency (col. 21, lines 6-14). Alternatively, Jacobsen's explanation that the CRT with resonant microcavity is superior to conventional methods for full color projection televisions because it allows highly directional output, controlled chromaticity, and high external efficiency (col. 13, lines 9-15) suggests that the CRT with resonant microcavity as an image source is superior to a liquid crystal display, a method for full color projection television that has been available for over twenty years, for those reasons. Also, the disclosure in Moskovich that telecentric lens assemblies, such as the one disclosed in Blei (Fig. 2 shows that the lens assembly is telecentric), are designed to gather and transfer light efficiently from an image source that emits light into a small cones of light with centers perpendicular to the image source (col. 2, lines 37-50) suggests that a directional light source such as the CRT with resonant microcavity of Jacobsen could replace the LCD of Blei with good performance of the system. Therefore, it would have been

obvious to one of ordinary skill in the art to use the Jacobsen cathode ray tube including a resonant microcavity phosphor and capable of producing telecentric light for an image as the light source for the Blei system, or instead of the liquid crystal display in the Blei system, because a cathode ray tube including a resonant microcavity phosphor would provide increased light output efficiency, highly directional output, and controlled chromaticity, as taught by Jacobsen.

In regard to claim 2, in the Blei system, the aspheric lens element is negatively powered (lens element 40 is shown to be a negative meniscus lens in Fig. 2).

In regard to claim 5, the Blei lens assembly includes a field lens (18; shown in detail in Fig. 3) having a planar surface (103) coupled to the image source (as shown in Figs. 2 and 3, because the image source emits light into small cones perpendicularly to its surface, the field lens is close enough to gather all the light from the image source, as it would still be if the LCD were replaced with the CRT with resonant microcavity of Jacobsen, which also emits directional light)

In regard to claim 6, the Jacobsen cathode ray tube inherently includes a faceplate because either the microcavity itself, disclosed to be coplanar in col. 13, line 24, is the faceplate, or it has other covering layers, one of which will have the surface from which light exits the CRT. Blei discloses a system wherein the field lens is optically coupled to an image source that includes a cover glass (Fig. 2). If the Jacobsen cathode ray tube were used as the image source in the Blei system with its light exit surface, the outer surface of its faceplate, in the same location as the light exit surface of the LCD with cover glass, the field lens would be optically coupled to the CRT faceplate as well.

In regard to claim 7, the Blei lens assembly includes a planar gap between the cover glass and the field lens (between elements 19 and 18 in Fig. 2 and between surfaces 102 and 103 in Table 1 there is a planar gap of 0.9 mm) that would remain if the cover glass for the LCD were replaced with the faceplate of the Jacobsen CRT.

In regard to claim 9, Blei discloses a system for projecting an image (Fig. 2), comprising an LCD that produces telecentric light for an image (5); and a lens assembly (the optical elements from field lens 18 to negative meniscus lens 41 along optical axis OA), the lens assembly comprising: a field lens (18) having a planar surface (103, shown in detail in Fig. 3) and optically coupled to a cover glass of the LCD (Fig. 2), a negatively powered spherical lens element (39), an aspheric lens element (40; paragraph [0031]), a set of positively powered lens elements (38, 36, 34, 32, and 31), and a negatively-powered meniscus lens element (41) adapted to locate the image (Fig. 1: light exiting lens element 41 is focused on screen 10).

However, Blei does not disclose that the system comprises a cathode ray tube including a resonant microcavity phosphor and a faceplate, said cathode ray tube capable of producing telecentric light for an image, and Blei does not disclose that the field lens is optically coupled to the faceplate. Jacobsen discloses a system for projecting an image comprising a cathode ray tube including a resonant microcavity phosphor and a faceplate (the Jacobsen CRT inherently has a faceplate because either the microcavity itself, disclosed to be coplanar in col. 13, line 24, is the faceplate, or it has other covering layers, one of which will have the surface from which light exits the CRT), said cathode ray tube capable of producing telecentric light for an image (Fig. 23, col. 13, lines 1-15). Furthermore, Jacobsen's explanation that the CRT with resonant microcavity is superior to conventional methods for full color projection televisions because it

allows highly directional output, controlled chromaticity, and high external efficiency (col. 13, lines 9-15) suggests that the CRT with resonant microcavity as an image source is superior to a liquid crystal display, a method for full color projection television that has been available for over twenty years, for those reasons. Also, the disclosure in Moskovich that telecentric lens assemblies, such as the one disclosed in Blei (Fig. 2 shows that the lens assembly is telecentric), are designed to gather and transfer light efficiently from an image source that emits light into a small cones of light with centers perpendicular to the image source (col. 2, lines 37-50) suggests that a directional light source such as the CRT with resonant microcavity of Jacobsen could replace the LCD of Blei with good performance of the system. Therefore, it would have been obvious to one of ordinary skill in the art to use the Jacobsen cathode ray tube including a resonant microcavity phosphor and a faceplate and capable of producing telecentric light for an image instead of the liquid crystal display in the Blei system, because a cathode ray tube including a resonant microcavity phosphor would provide increased light output efficiency, highly directional output, and controlled chromaticity, as taught by Jacobsen.

Furthermore, if the Jacobsen CRT were used instead of the LCD, the field lens would be optically coupled to the faceplate of the Jacobsen CRT in the same manner that it is optically coupled to the cover glass of the LCD because the light from the Jacobsen CRT is emitted perpendicularly to the faceplate into a small cone just as the light from the LCD is emitted perpendicularly to the cover glass into a small cone (Fig. 2).

In regard to claim 10, Blei discloses a system for projecting an image (Fig. 2), comprising an LCD that produces telecentric light for an image (5); a telecentric (the principal rays are parallel to the optical axis at the image source) lens assembly (the optical elements from field

lens 18 to negative meniscus lens 41 along optical axis OA) including a field lens (18), and wherein said telecentric lens assembly is adapted to receive an image from the LCD (Fig. 2); wherein the field lens includes a planar surface (103, shown in detail in Fig. 3) optically coupled to the cover glass of the LCD (Fig. 2: because the image source emits light into small cones perpendicularly to its surface, the field lens is close enough to gather all the light from the image source); and wherein the lens assembly includes a planar gap or cavity between the cover glass and the field lens (Fig. 2 and Table 1: there is a planar gap of 0.9 mm between surfaces 102 and 103).

However, Blei does not disclose that the system comprises a cathode ray tube including a resonant microcavity phosphor and having a faceplate, said cathode ray tube capable of producing telecentric light for an image, that the telecentric lens is adapted to receive an image from the cathode ray tube, that the planar surface of the field lens is optically coupled to the faceplate, and that the planar gap is between the faceplate and the field lens.

Jacobsen discloses a system for projecting an image comprising a cathode ray tube including a resonant microcavity phosphor and having a faceplate (the Jacobsen CRT inherently has a faceplate because either the microcavity itself, disclosed to be coplanar in col. 13, line 24, is the faceplate, or it has other covering layers, one of which will have the surface from which light exits the CRT), said cathode ray tube capable of producing telecentric light for an image (Fig. 23, col. 13, lines 1-15). Furthermore, Jacobsen's explanation that the CRT with resonant microcavity is superior to conventional methods for full color projection televisions because it allows highly directional output, controlled chromaticity, and high external efficiency (col. 13, lines 9-15) suggests that the CRT with resonant microcavity as an image source is superior to a

liquid crystal display, a method for full color projection television that has been available for over twenty years, for those reasons. Also, the disclosure in Moskovich that telecentric lens assemblies, such as the one disclosed in Blei (Fig. 2 shows that the lens assembly is telecentric), are designed to gather and transfer light efficiently from an image source that emits light into a small cones of light with centers perpendicular to the image source (col. 2, lines 37-50) suggests that a directional light source such as the CRT with resonant microcavity of Jacobsen could replace the LCD of Blei with good performance of the system. Therefore, it would have been obvious to one of ordinary skill in the art to use the Jacobsen cathode ray tube including a resonant microcavity phosphor and having a faceplate and capable of producing telecentric light for an image instead of the liquid crystal display in the Blei system, because a cathode ray tube including a resonant microcavity phosphor would provide increased light output efficiency, highly directional output, and controlled chromaticity, as taught by Jacobsen.

Furthermore, if the Jacobsen CRT were used instead of the LCD, the other three limitations not disclosed in Blei would be met by the combination. The telecentric lens would be adapted to receive an image from the cathode ray tube (because the Blei telecentric lens is adapted to receive an image from the LCD, it would also be adapted to receive an image from the CRT in place of the LCD because the CRT would also produce directional light, which, as taught by Moskovich, is efficiently gathered and transferred by a telecentric lens). Also, the field lens would be optically coupled to the faceplate of the Jacobsen CRT in the same manner that it is optically coupled to the cover glass of the LCD because the light from the Jacobsen CRT is emitted perpendicularly to the faceplate into a small cone just as the light from the LCD is emitted perpendicularly to the cover glass into a small cone (Fig. 2). Furthermore, the planar gap

would be between the faceplate and the field lens because the faceplate would be substituted for the cover glass of the LCD (if the faceplate is the microcavity itself, the gap might have to be widened somewhat to maintain focus on the screen, or focus could be adjusted with different lens elements; if the faceplate has a thick cover glass in front of the microcavity, the gap might have to be narrowed).

In regard to claim 11, the Blei lens assembly includes a focusing group (lens elements 31 to 41) including additional optical elements for transmitting and focusing the image from the field lens onto the projection surface (Figs. 1 and 2).

In regard to claim 12, in the Blei system, the focusing group includes a selection of lens including any of a spherical lens adapted to redirect telecentric light for a projected image, a negatively-powered aspheric lens element adapted to correct residual curvature of light passing through the spherical lens, a set of positively powered lens elements adapted to adjust the size of the projected image, and/or a negatively-powered meniscus lens element (lens element 41) adapted to locate the light received from the set of positively powered lens elements at a desired throw distance (Figs. 1 and 2).

In regard to claim 16, Blei discloses a lens assembly according to claim 15, as explained in the rejection under 35 U.S.C. §102 above. However, Blei does not disclose a cathode ray tube adapted to generate the image to be projected. Jacobsen discloses a cathode ray tube adapted to generate the image to be projected (Fig. 23, col. 13, lines 1-15). Furthermore, Jacobsen's explanation that the CRT with resonant microcavity is superior to conventional methods for full color projection televisions because it allows highly directional output, controlled chromaticity, and high external efficiency (col. 13, lines 9-15) suggests that the CRT with resonant

microcavity as an image source is superior to a liquid crystal display, a method for full color projection television that has been available for over twenty years, for those reasons. Also, the disclosure in Moskovich that telecentric lens assemblies, such as the one disclosed in Blei (Fig. 2 shows that the lens assembly is telecentric), are designed to gather and transfer light efficiently from an image source that emits light into a small cones of light with centers perpendicular to the image source (col. 2, lines 37-50) suggests that a directional light source such as the CRT with resonant microcavity of Jacobsen could replace the LCD of Blei with good performance of the system. Therefore, it would have been obvious to one of ordinary skill in the art to use the Jacobsen cathode ray tube adapted to generate the image to be projected instead of the liquid crystal display in the Blei system, because a cathode ray tube including a resonant microcavity would provide increased light output efficiency, highly directional output, and controlled chromaticity, as taught by Jacobsen.

In regard to claim 17, the Jacobsen cathode ray tube inherently has a faceplate because either the microcavity itself, disclosed to be coplanar in col. 13, line 24, is the faceplate, or it has other covering layers, one of which will have the surface from which light exits the CRT. Furthermore, the image source is inherently the faceplate of the Jacobsen cathode ray tube because, by definition, light exits from the faceplate. Therefore, if the Jacobsen cathode ray tube were used instead of the liquid crystal display in the Blei system, in a projection system of the type disclosed in col. 13, lines 1-15 of Jacobsen, the image source would be the cathode ray tube faceplate.

In regard to claim 18, Jacobsen discloses that the cathode ray tube is a resonant microcavity phosphor device (col. 13, line 1-23). Furthermore, Jacobsen teaches a cathode ray

tube that is a resonant microcavity phosphor device has the advantages detailed above. In particular, such a device would have highly directional output, which Moskovich teaches is appropriate for use with a telecentric lens assembly, such as the Blei lens assembly (as explained above). Therefore, it would have been obvious to one of ordinary skill in the art to use the Jacobsen cathode ray tube that is a resonant microcavity phosphor device instead of the LCD in the Blei lens assembly because such a device would have the highly directional output that is efficiently coupled to the Blei telecentric lens, as taught by Jacobsen and Moskovich.

In regard to claim 19, the Blei telecentric lens assembly includes a field lens (18) having a planar surface (shown in detail in Fig. 3) coupled to the image source (Figs. 2 and 3: the field lens gathers and transfers all the light from image source LCD 5). If the Jacobsen CRT faceplate were substituted for the LCD in the Blei lens assembly, the field lens would still be coupled to the image source because the Jacobsen CRT faceplate emits the light perpendicularly into a small cone just as the light from the LCD is emitted perpendicularly to the cover glass into a small cone (Fig. 2).

In regard to claim 20, in the Blei lens assembly, the field lens is optically coupled to the cover glass of the LCD (Fig. 2). Therefore, if the Jacobsen CRT faceplate were substituted for the LCD in the Blei lens assembly, the field lens would be optically coupled to the faceplate because the Jacobsen CRT faceplate emits the light perpendicularly into a small cone just as the light from the LCD is emitted perpendicularly to the cover glass into a small cone (Fig. 2).

In regard to claim 21, the Blei lens assembly includes a planar gap or cavity between the cover glass and the field lens (between elements 19 and 18 in Fig. 2 and between surfaces 102

and 103 in Table 1) that would remain if the cover glass for the LCD were replaced with the faceplate of the Jacobsen CRT.

14. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over international publication WO 02/080577 A1 (application number PCT/EP02/03385; the publication US 2004/0090600 A1 by Blei et al. is used as a translation of the international publication; although the discussion below refers to the reference as "Blei' and cites text and figures in the translation, the basis for the rejection is the international publication) in view of Jacobsen (5,804,919) and further in view of Moskovich (5,200,861, hereinafter "Moskovich '861'") and still further in view of Moskovich (6,791,629, hereinafter "Moskovich '629'").

In regard to claim 13, Blei discloses a system that makes claim 10 obvious in view of Jacobsen and Moskovich '861, as explained above. Furthermore, Blei discloses that the system has multiple image sources for different colors (5-7 in Figs. 1 and 2). However, Blei does not disclose that the system further comprises multiple cathode ray tubes, wherein each cathode ray tube is capable of projecting telecentric light for an image, and a telecentric lens system for each of said multiple cathode ray tubes. Jacobsen discloses a system for projecting an image comprising multiple cathode ray tubes (col. 13, lines 9-10). Furthermore, Jacobsen teaches that three separate cathode ray tubes are necessary for each of the primary colors. Therefore, it would have been obvious to provide multiple cathode ray tubes in the projection system of Blei in view of Jacobsen and Moskovich because the separate CRT's are necessary for each of the primary colors, as taught by Jacobsen.

Moskovich '629 discloses a system for projecting an image that comprises multiple cathode ray tubes (col. 1, lines 15-17) and a lens system for each of the multiple cathode ray tubes (col. 12, lines 48-50). Furthermore, Moskovich '629 teaches that a separate lens system for each of the CRT's allows for improved image quality because the lens system for each color can be corrected differently for aberrations (col. 7, lines 2-25 and 61-67). Therefore, it would have been obvious to one of ordinary skill in the art to include a telecentric lens system for each of the multiple cathode ray tubes of the system of Blei in view of Jacobsen and Moskovich '861, as disclosed by Moskovich '629, because the lens system for each color can be corrected differently for aberrations, thereby improving image quality, as taught by Moskovich '629.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hall, Jr., et al. (6,747,710) teaches that a cathode ray tube with a resonant microcavity display is advantageously substituted for a conventional light source in a non-CRT projection device (col. 3, lines 1-40).

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deborah A. Raizen, Ph.D., J.D., whose telephone number is (571) 272-2336. The examiner can normally be reached on Monday-Friday, from 10:00 a.m. to 3:00 p.m. Eastern Standard Time (a part-time schedule).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached at (571) 272-2328. The USPTO central official fax number is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. For more information, see http://pair-direct.uspto.gov. For access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or at 703-305-3028 or at 703-308-6845, or by e-mail at: ebc@uspto.gov. Additional information is available on the Patent EBC Web site at: http://www.uspto.gov/ebc/index.html.

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